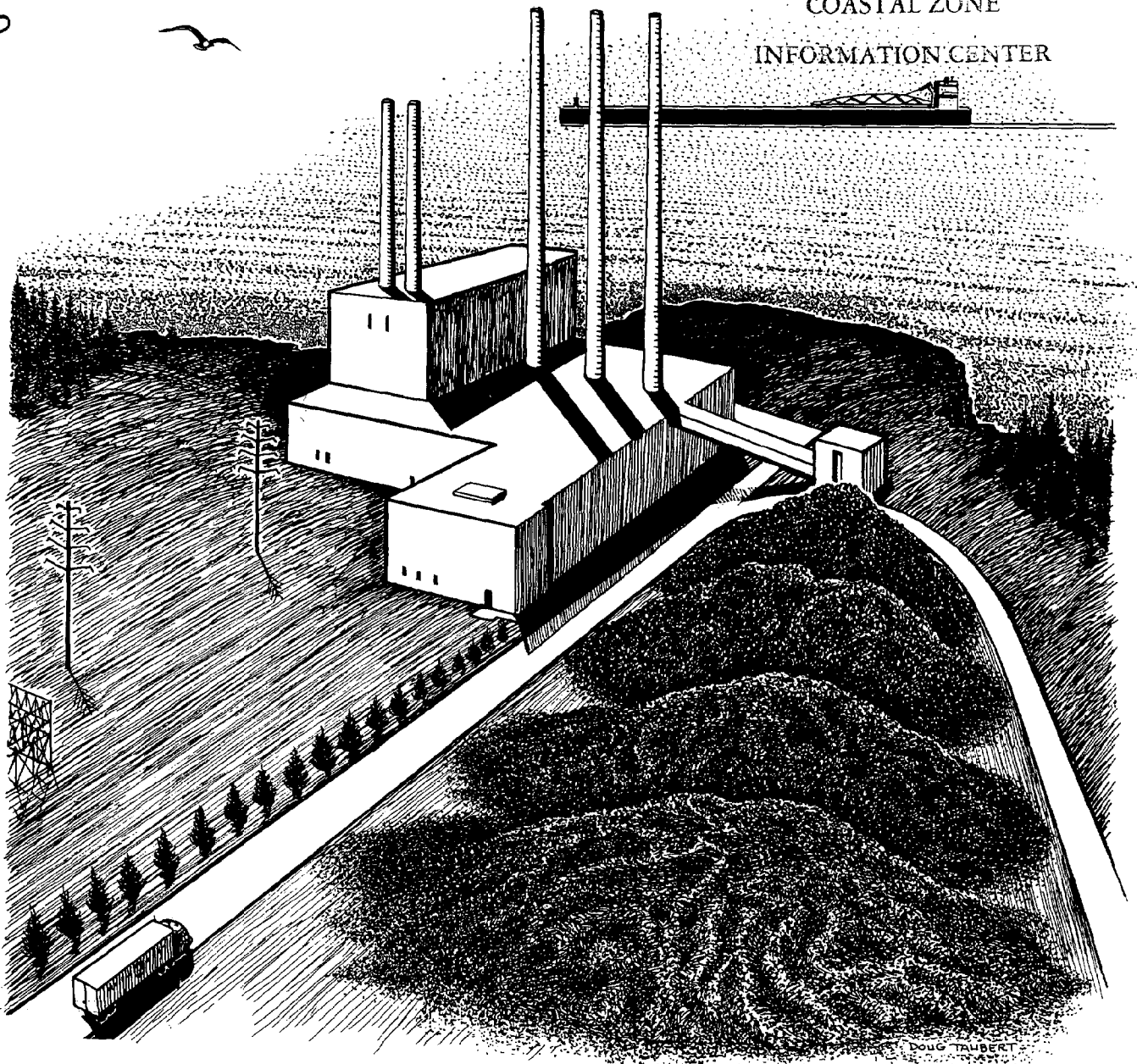


Energy Site Impacts

TOWN OF LAWRENCE

COASTAL ZONE
INFORMATION CENTER



TK
1225
.L39
W37
1982



BAY-LAKE Regional Planning Commission
serving communities within the counties of:

FLORENCE • MARINETTE • OCONTO • BROWN • DOOR • KEWAUNEE • MANITOWOC • SHEBOYGAN

Wisconsin Coastal Zone Management Program

ENERGY SITE IMPACTS
TOWN OF LAWRENCE
Brown County

Prepared by:

Joe Warnacut
Energy Planner
Bay-Lake Regional Planning Commission

MARCH 1982

Financial assistance provided by the State of Wisconsin, Coastal Management Program, Department of Administration, and the Coastal Zone Management Act of 1972, as amended, administered by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration.

TK1225.L39W37 1982

TABLE OF CONTENTS

	PAGE
400 MW COAL FIRED POWER PLANT PROJECT	1
Description of Proposed Action	1
Type of Facility - Main Components	2
Solid Waste Disposal Landfill	5
PHYSICAL ENVIRONMENT	7
Location	7
Overviews of the Lawrence Site	7
General Description	7
Bedrock	7
Glacial Deposits	9
Soils	10
Water Table	12
Fish & Wildlife	14
SOCIAL ECONOMIC ENVIRONMENT	14
Population	14
Employment	15
Income	17
Community Services	18
Sewer	18
Water	19
Schools	20
Recreation	21
Land Use	21
Transportation Network	22
Roads	22
Railroads	24
Airports	24
Transmission Lines	26
CONSTRUCTION PHASE IMPACTS	27
Social Environment	27
Relocation of Residents	27
Work Force	29
Labor Related Impacts	30
Housing	30
Local Services	31
Traffic	31
Economic Environment	32
Employment	32
Utility Shared Tax	32
Physical Environment	34
Surface Water	34
Noise	34

	PAGE
OPERATIONAL PHASE IMPACTS	35
Social Environment	35
Transportation	35
Employment	36
Economic Environment	38
Utility Tax	38
Community Services	39
Physical Environment	39
Land Uses	39
Water Quality	39
Air Quality	40
SUMMARY	43

400 MW COAL FIRED POWER PLANT PROJECT

DESCRIPTION OF PROPOSED ACTION

Utilities often work in cooperation with each other to help fulfill electrical demands. For instance, if a shutdown was necessary at a generating plant, electricity could be bought from another utility until power is started up again. On the other hand, a utility "going it alone" would need a spare power plant to meet demands during shut down or peak flow periods. The utility power planning groups also identify future goals and needs, and plan together to meet them. The normal procedure in power plant construction is for each utility to take its turn in building a larger sized plant to furnish power to meet its own needs and the needs of the other utilities at the time the plant begins operation. Within a few years, the utility needs all of the power from the new plant and other utilities must buy from someone else.

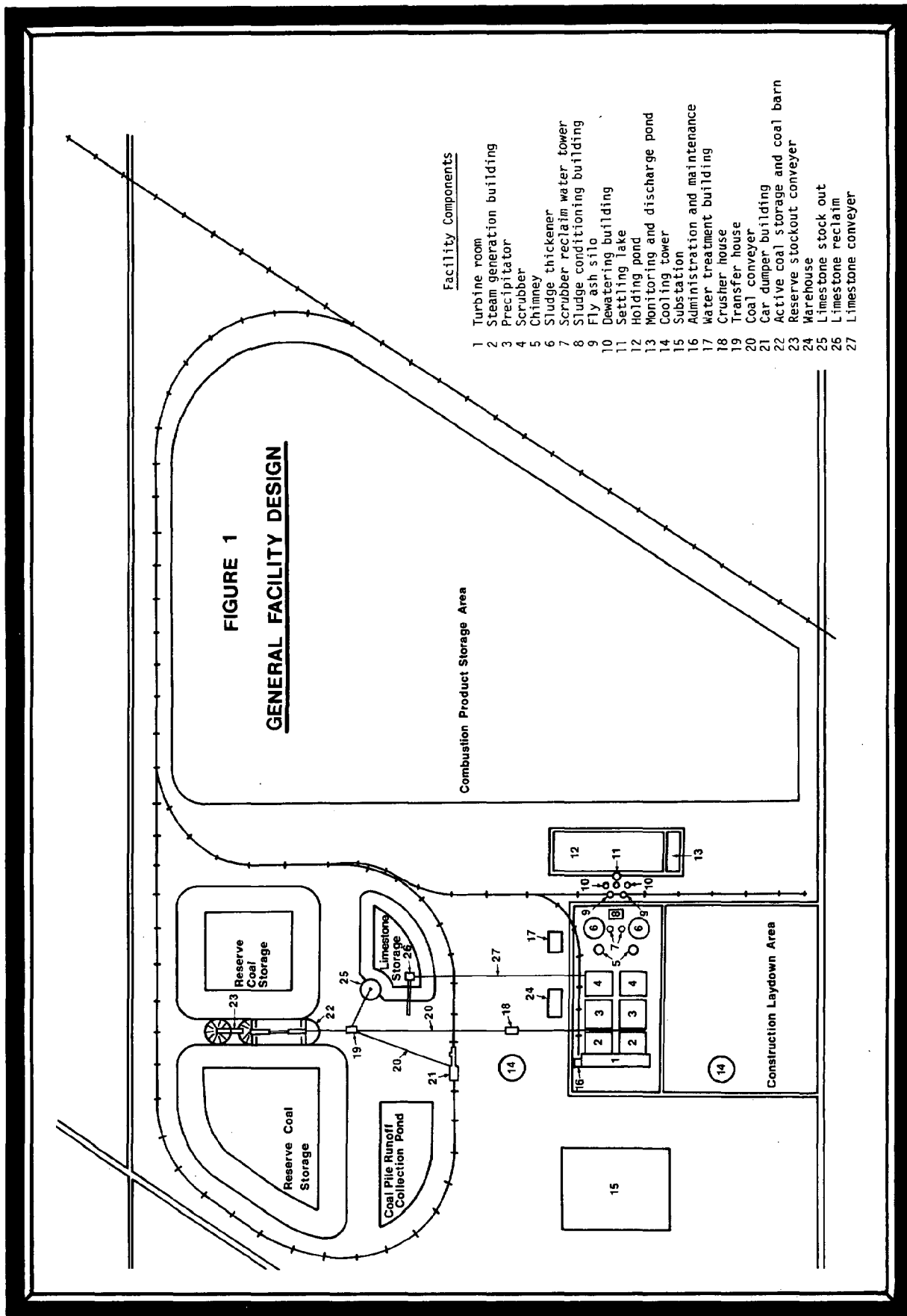
Wisconsin Public Service Corporation (WPSC) has combined its efforts with three other Wisconsin utility companies in forming a planning group called the Eastern Wisconsin Utilities (EWU). Each company does its own power demand forecasting, but through the EWU a coordinated plan is completed that identifies generating systems which will provide an adequate and reliable supply of energy in the future. WPSC has proposed that a 400 megawatt coal fired electrical generating facility be constructed in one of three locations, two of which are in the Bay-Lake Region (Oconto and Lawrence). The generating station is expected to begin operation in 1992.

The original report from Wisconsin Public Service Corporation to the Wisconsin Public Service Commission identified 35 potential sites. The selection criteria applied during site analysis eliminated all but three of the originally named sites. Among some of the major criteria reviewed for each facility are hydrology, geology, meteorology/air quality, ecology and land use. Of the three final sites, the Town of Lawrence was chosen as the primary site and the Town of Oconto as the alternate site. Indepth studies such as the environmental impact statements, and soils and hydrology testing will soon be initiated. Following the completion of the studies any necessary changes that must be made to the construction plans of the power plant to be sure the plant operates in harmony with the environment will be undertaken as early as possible.

Type of Facility - Main Components

The facility planned by WPSC will be a modern, technically advanced plant. A general description of the operation and identification of the major components will illustrate WPSC's efforts to generate electricity as cleanly as possible. The plant layout is graphically displayed in Figure 1.

Two generating units were originally planned to produce 600-800 megawatts (i.e., 300-400 megawatts each). Due to reduced demand, a 400 MW plant will be constructed; however, the site will be prepared to house the second unit for future expansion. Each unit will be housed in separate buildings and will maintain individual components. However, a common turbine room, sludge conditioning room and the transformers will be designed to serve both units.



The turbine room is located adjacent to the steam generating building, and can be operated by either one or both units. Coal is burned here to produce the steam that drives the turbines. The precipitator, which is located next to the generating building, collects the particulates (fly ash) from the emission. The emission then passes through a spray type sulfur dioxide scrubber where a wet spray removes pollutants from the gas stream by means of chemical reactions. Scrubbers also serve to cool emission temperatures. Emissions are then released through a 550 foot high smoke stack. The next few steps prepare the sludge and fly ash for safe storage.

The cooling system for a 400 MW facility operating at full capacity will require approximately a 200,000 gpm flow of circulating water through the condenser to absorb excess boiler heat. The cooling water is then circulated into a mechanical draft cooling tower to dissipate the absorbed heat before being recycled back into the system. A mechanical draft cooling tower stands approximately 60 feet high. Because of the compactness of the unit, fans will be used to help the cooling process. The system creates noise, uses electrical energy and releases large amounts of water vapor (approximately 4000 gpm at maximum operation). Makeup water is expected to come from on-site deep wells or the nearby river.

Separate handling systems and storage areas will be provided for coal and limestone. Limestone which is necessary for the scrubbing process will be stored near the scrubbers. Limestone will be reclaimed from storage by utilizing underground reclaim hoppers and conveyed to the limestone preparation facility located near the scrubbers. The coal

handling system is very similar, with the exception of being conveyed to the steam generating area rather than to the scrubber.

The electrical power produced by the generator is converted to a useable power, monitored, controlled and released to powerlines at the power plant's substation. This area contains the switchboards, switches, wiring, fuses, circuit breakers, compensators and transformers.

Solid Waste Disposal Landfill

One of the most troublesome issues to most power plant planners is the disposal of solid wastes. Approximately 170,000 to 175,000 tons of sludge and ash will be produced each year. Compounds that make up the wastes can be detrimental to surface water and groundwater, so special care must be given to line the disposal site with impermeable liners. Various sealing materials can be used; clay, bentonite, synthetic liners, and stabilized fly ash and scrubber solids are among the most common. A bentonite, synthetic liner or a clay liner will be used at this proposed facility. Cover materials must also be applied to prevent the ash from becoming airborne.

Most power plant plans now require the solid waste disposal area to be located on site to reduce shipping costs. An estimated 250 to 325 acres will be required for the disposal area. Studies are in progress that are trying to determine uses for these byproducts. Currently, a small market exists for use of fly ash as an ingredient for concrete and cement products. Western coal has a higher sale potential because of its high content of calcium. Further long-term research is necessary, however,

to make sure that the fly ash component is not detrimental to the environment.

It takes three to four years to construct a power plant. During this period 450-550 people may be employed, mostly through the construction trades. Most of the skilled workers are needed for three to twelve months to complete certain functions before being replaced by workers with new skills and trades. The construction phase is long enough that short-term housing may have to be found for many of these employees, especially at the sites located in small rural communities, where the work force will have to be brought in from other locations. Impacts upon schools, housing and local services may be experienced for temporary time periods. When the construction phase is over, employment at the facility will be reduced to 70 permanent employees. Communities should be prepared for changes during and after the installation of a major electrical generating facility.

Most of the information for this segment came from planning documents drafted by Wisconsin Public Service Corporation, particularly their 1978 and 1981 Site Analysis. Since construction of this project is not scheduled to begin until 1988, it is reasonable to expect that some changes will be made in these plans.

PHYSICAL ENVIRONMENT

LOCATION

Nearest Town	Wrightstown
USGS Map 15' Series	De Pere
Township	22N
Range	19E
Sections	22, 23, 24

Overviews of the Lawrence Site

Wisconsin Public Service Corporation has chosen the Town of Lawrence site as its primary site for the proposed power plant. This site is located in Brown County approximately two miles north of the Village of Wrightstown parallel to the west bank of the Fox River. The site consists of approximately 770 acres of privately owned farmland. The entire parcel is zoned for agriculture, and is used for farming, except for 18 acres which are wooded, and some land which is used for farm dwellings.

The terrain on the site is relatively level, sloping approximately 50 feet toward the Fox River. Flooding is not a problem on this site.

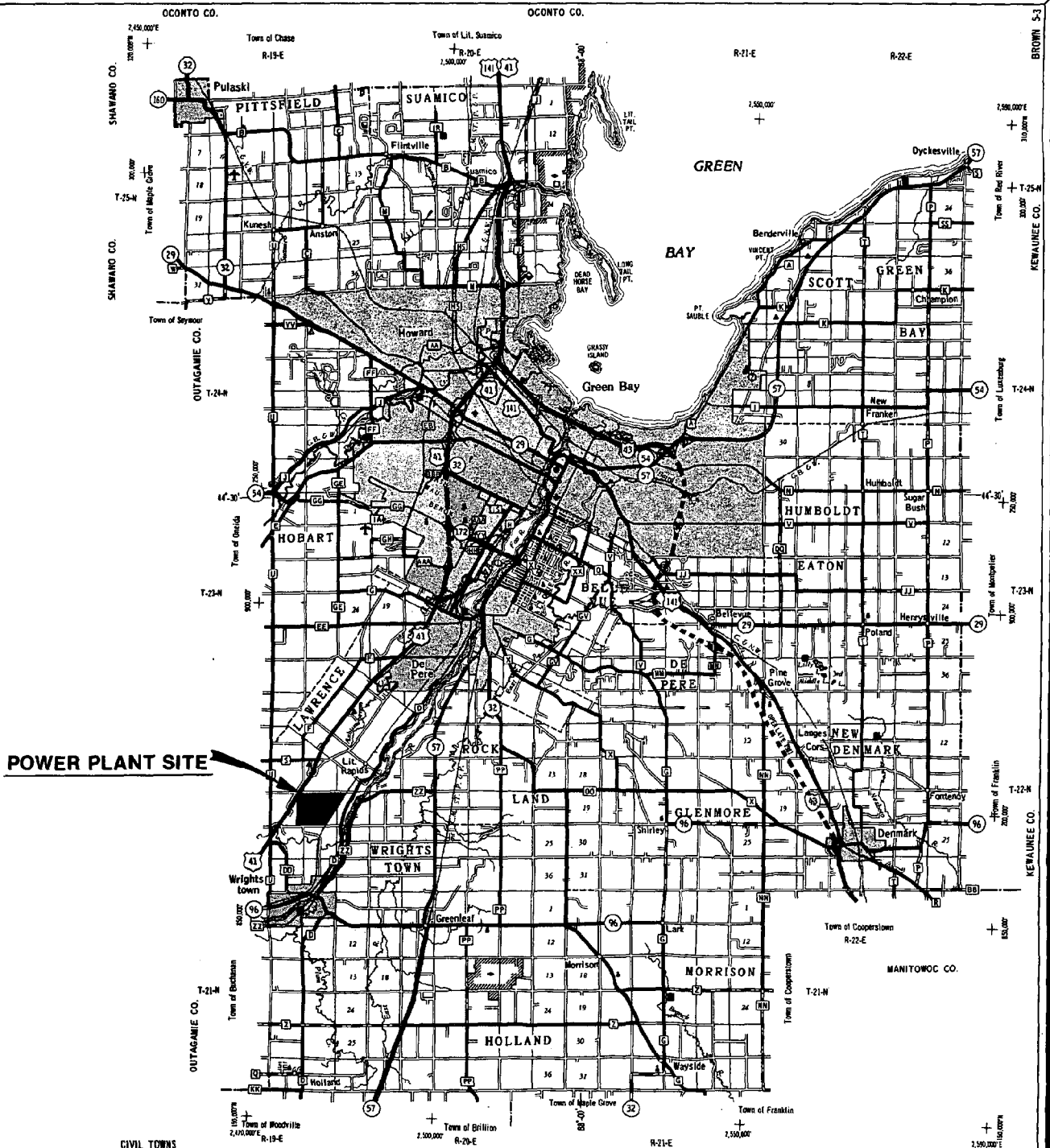
The north and south boundaries of the site are a pair of local roads. The Chicago and Northwestern Rail line borders the site to the east, while portions of the west boundary border U.S. Highway 41 and private properties. Map 1 shows site location.

GENERAL DESCRIPTION

Bedrock

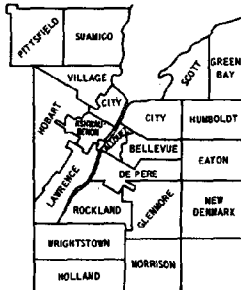
Located approximately 125 feet below the ground surface a series of bedrock formations begins. These different formations dictate the

MAP 1



POWER PLANT SITE

CIVIL TOWNS



CALUMET CO.

CALUMET CO. MANITOWOC CO.

TOWNSHIP NUMBERS											
6	5	4	3	2	1						
7	8	9	10	11	12						
18	17	16	15	14	13						
19	20	21	22	23	24						
30	29	28	27	26	25						
31	32	33	34	35	36						



GENERAL LOCATION MAP

BROWN CO.

DEPARTMENT OF TRANSPORTATION

STATE OFFICE BUILDING

Madison, Wisconsin

SCALE 1:100,000 MILES

Corrected for

JAN. 1981

Compiled from U.S.S.S. Quadrangles

Drawn on Aerial Photographs

+ Grid based on Wisconsin coordinate system, north-central zone.

BROWN 5-3

accessibility and quantities of water as well as water movement of surface and subsurface waters. The proposed power plant will use groundwater for its service water makeup. It is expected that 280 gallons per minute will be required for this purpose from groundwater sources.

The uppermost bedrock at this location is the Sinnipee Group, which is nearly 150 feet in depth. This group is a dolomite with little water yielding capabilities. Directly beneath the Sinnipee is the St. Peters sandstone. The depth on location is 130 to 150 feet. The St. Peters formations have moderate to large quantities of water. The third layer of bedrock is the Prairie du Chien Group. This group is another dolomite, about 120 feet in depth, and like other dolomites, it is a poor source for water.

The Cambrian Sandstone is located about 450 feet below the surface of the earth's crust, and is the main source for high quantity water needs. Wrightstown, De Pere, the Fort Howard Paper Company and many other industries and communities use this sandstone for their source of water. The total demand upon this source in 1976 was 10.9 MGD. The 1977 Brown County Water Plan Update predicts that by 1990 the demand will increase to 23.9 MGD. The estimated demand that the power plant will place on the aquifer is .4 MGD, and this is not expected to significantly affect the groundwater.

Glacial Deposits

Four major glacial stages advanced and retreated in Wisconsin. As the glaciers retreated, deposits of glacial debris were left over the bedrock surface. In the location of the proposed power plant site, approximately 150 feet of clay, silt, sand and gravel remain covering the bedrock.

This layer of glacial deposits is not considered an important source for water, although if the well were in a sand and gravel bed, a substantial amount of water could be pumped. Glacial deposits are also parent materials for existing soils of the same area. See Figure 2 for glacial drift diagram.

Soils

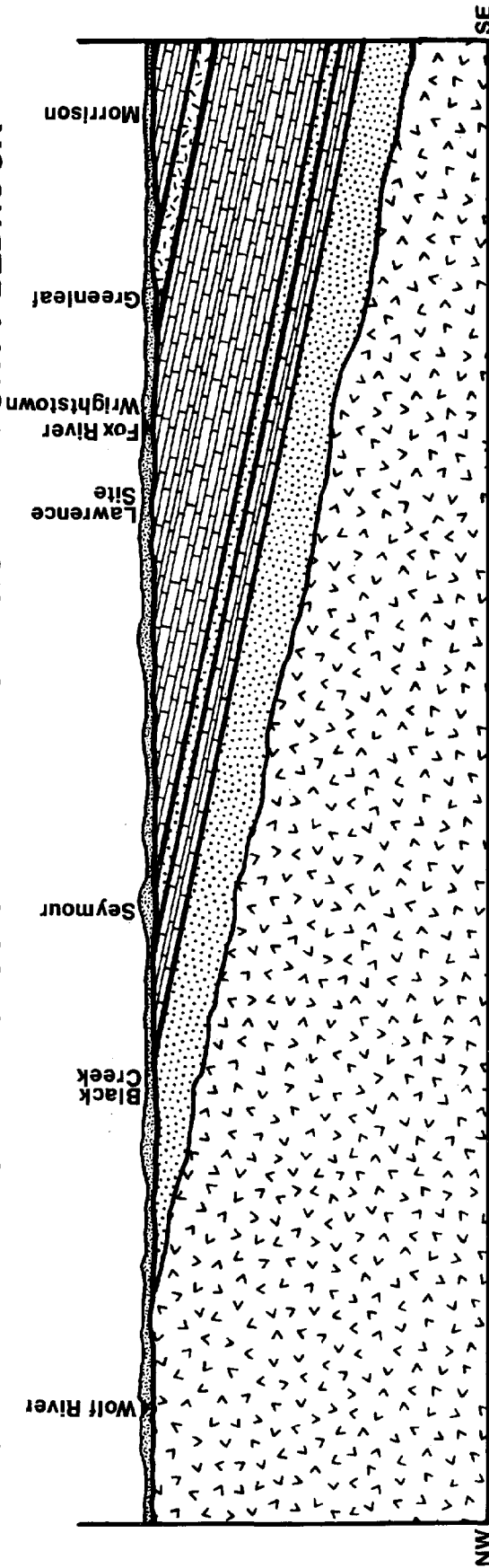
Eight different soils exist throughout the Lawrence site. Over 3/4 of the site is made up of soils from the Oshkosh series. This series consists of deep, well-to-moderately drained soils, and is well suited for all crops common to the area. The depth to water table is 3 to 5 feet.

The Allendale series is found in several southwestern locations within the site. This soil is deep and somewhat poorly drained. The depth to the water table is 1 to 3 feet. Most crops commonly grown in the county can be suitably grown in this soil.

The Shawano series is a deep, excessively drained soil found in the area of the cemetery. The water table is five feet or more in depth. This soil is better suited for trees and wildlife habitat than for crops.

The remaining soils are found scattered throughout the western portions of the site. Much like the characteristics of the other soils, they are deep, well to somewhat poorly drained, nearly level soils that have clayey subsoils. Map 2 delineates the soils on the site. The descriptions of each soil can be found in Table 1.

FIGURE 2
GENERALIZED CROSS SECTIONAL VIEW OF BROWN COUNTY BEDROCK



LEGEND VERTICAL ELEVATIONS EXAGGERATED

ROCK TYPE	GEOLOGIC TIME PERIOD	MILLIONS OF YEARS AGO
GLACIAL DRIFT	QUATERNARY (PLEISTOCENE)	0-2
SILURIAN DOLOMITE	SILURIAN	405-425
MAQUOKETA SHALE	ORDOVICIAN	425-500
PLATTEVILLE-GALENA DOLOMITE	ORDOVICIAN	425-500
ST. PETER SANDSTONE	ORDOVICIAN	425-500
PRAIRIE DU CHIEN DOLOMITE	ORDOVICIAN	425-500
CAMBRIAN SANDSTONE	CAMBRIAN	500-600
GRANITE AND OTHER CRYSTALLINE ROCK	PRECAMBRIAN	3,800

SOURCE: F.T. THWAITES AND KENNETH BERTRAND; PLEISTOCENE GEOLOGY OF THE DOOR PENINSULA, WISCONSIN.; U.S.G.S. HYDROLOGIC ATLAS HA-432.

TABLE 1
SOIL CHARACTERISTICS FOR THE LAWRENCE SITE

Series	Depth to Water Table	Agriculture Potential (Crops)	Sanitary Landfill Limitations
Om, On, Os - Oshkosh	3-5'	Prime	Severe
Po - Poygan	0-1'	Prime if Drained	Severe
Ad - Allendale	1-3'	Statewide Importance	Severe
Wa - Wauseon	0-2'	Statewide of Drained	Severe
Sf - Shawano	5+'	Local Significance	Moderate
Sh - Sisson	5+'	Prime	Moderate
Kf - Kewaunee	5+'	Prime	Moderate
Mf - Manistee	5+'	Statewide - Local	Moderate

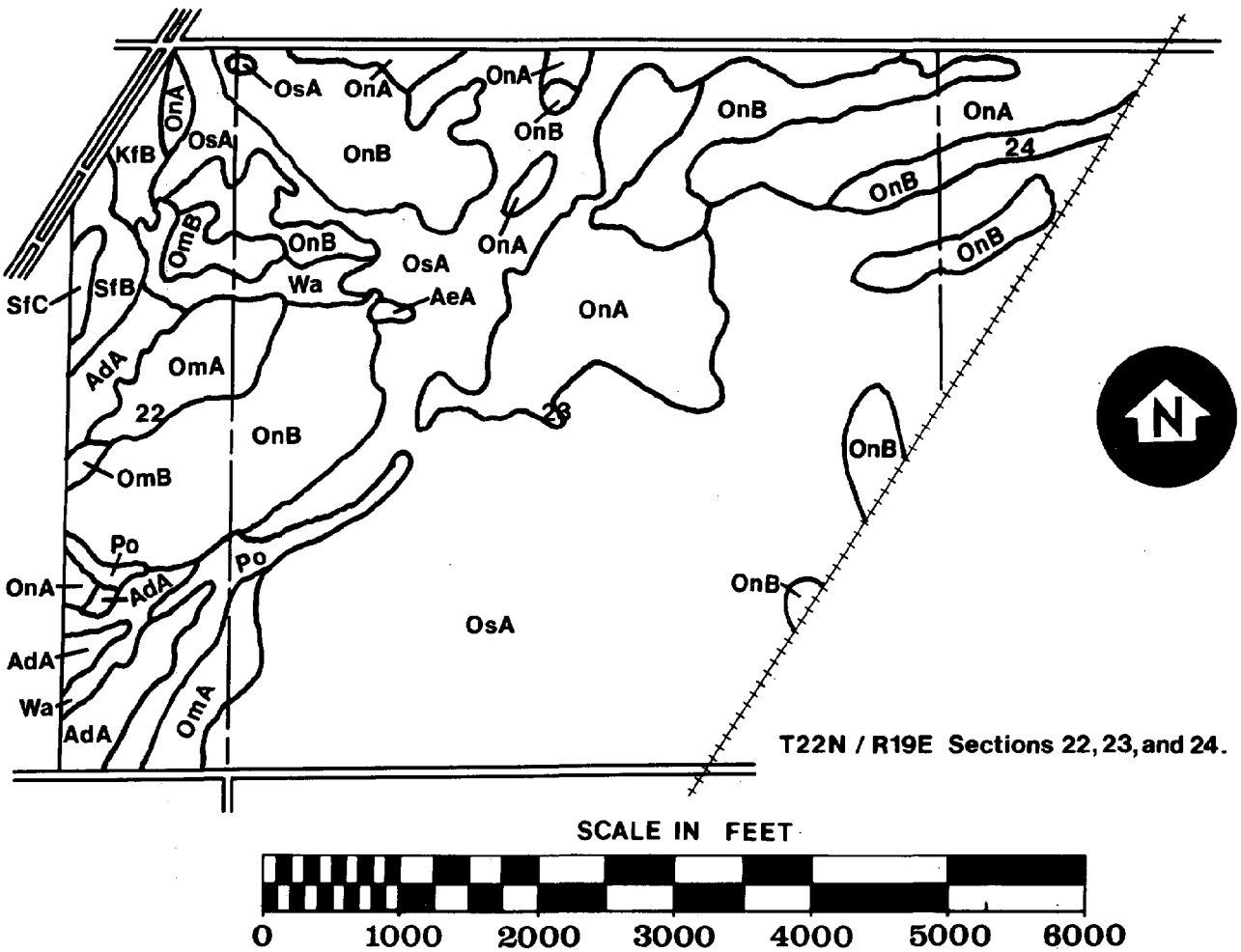
Source: U.S. Department of Agriculture Soil Conservation Service

Water Table

The depth of the water table on this site should not be a hindrance to the construction of this facility, since only a small portion of the site is considered wetland. Classification of the water table varies somewhat, but for the purpose of this site 0-2' depth of the water table is wetland, 2'-5' is seasonally high water table and greater than 5 feet usually has no high water problems. Map 2 shows areas of different classifications, and Table 1 gives pertinent characteristics of the soils.

It is already anticipated that the power plant structures would be supported on mat foundations and/or pile supported foundations. It cannot be determined what types or capacities of foundation would be needed until detailed subsurface data are obtained. The solid waste landfill may be more critical than the structures. The clay liner that is proposed must be impermeable or pollutants from the landfill would enter the water table. However, the Wisconsin Public Service Corporation believes that the coal unloading facility may be the most troublesome structure because it is a deep structure.

MAP 2
SOILS
PROPOSED SITE FOR THE BROWN COUNTY POWER PLANT



Source: USDA Soil Conservation Service.

Fish and Wildlife

Wildlife habitat on the site is, at best, limited. Squirrels, boblinks and other common small animals and birds inhabit this site. Only an 18 acre wooded area would serve as habitat, and it is too small and too secluded from other natural areas to be considered a quality habitat. Woodlands are important to most mammals because they offer refuge from natural predators. The larger the woodlot is, the more room for the animal to move about and the more solitude from human activities. The remaining acreage on site is used for residential and agricultural purposes.

The 1977 Wisconsin Coastal Atlas indicates that only minor fisheries, if any, are located in this region of the Fox River. This includes residing or spawning of game fish. However, as the water quality continues to improve, the fish population is expected to follow suit.

SOCIAL ECONOMIC ENVIRONMENT

POPULATION

According to the 1980 U.S. Census, Brown County has a population of 175,280 persons. This is a 10.76% increase from the 1970 census. The areas within the county that are located the nearest to the power plant project are the Town of Lawrence and the Village of Wrightstown. The Town of Lawrence, in which the site is located, has a population of 1,431 residents. This is an 11.78% decrease from the 1970 census. Wrightstown is the nearest community to the site and has the potential to be substantially impacted. The village's population increased 14.6% from the 1970 census and now has a population of 1,169. Table 2 gives population data of the area.

TABLE 2
POPULATION OF GOVERNMENTAL UNIT STUDY AREAS

	1970 Census	1980 Census	Number Change	Percent Change
Town of Lawrence	1,622	1,431	-191	-11.78
Village of Wrightstown	1,020	1,169	149	14.61
Brown County	158,244	175,280	17,036	10.76

Source: 1980 Decennial Census; Department of Commerce; and Bay-Lake Regional Planning Commission

EMPLOYMENT

The construction phase of the power plant may employ as many as 550 people during peak periods, and the operational phase will employ approximately 70 people. The Village of Wrightstown and the Town of Lawrence both have a limited available work force and could not provide a substantial amount of necessary workers. However, the site is located near the large urban areas of the Fox Cities and Green Bay where most of the employees could be expected to come from.

The metropolitan Green Bay area is only 8 miles north of the site, and has the potential of supplying a large number of workers to the project. According to data published by the Department of Industry, Labor and Human Relation (DILHR) this area has a labor force of approximately 72,500. Most construction phase employment will require skilled trades such as electricians, pipefitters and boilermakers. The Green Bay area has approximately 2,700 construction trade workers, and probably would have most of the required trades needed for this project.

Urban areas to the south of the site in the Fox Cities area have a large combined workforce and are accessible to the site by good highways. These areas could also be expected to supply a large amount of the workforce.

Certain trades that cannot be contracted locally can be found in other areas. Most large construction companies are mobile and could easily be moved into the area for temporary construction periods.

The Village of Wrightstown has 278 employment positions in both the public and private sector according to DILHR's 1980 employment data. Only six people report their profession in the construction field. The Town of Lawrence has 99 employment positions, with 15 in construction trades. Miscellaneous construction work and apprenticeships may be filled by local unskilled workforce personnel. Table 3 has an employment by sector breakdown for the study area and Brown County.

TABLE 3
EMPLOYMENT BY SECTOR

Employment Sectors	Town of Lawrence	Village of Wrightstown	Brown County
Agriculture/Forestry/Fishing	0	0	52
Mining	0	0	37
Construction	15	6	3,054
Manufacturing	11	74	21,817
Transportation/Communication/Utility	5	11	5,561
Wholesale Trade	44	7	4,703
Retail	11	64	15,294
Finance/Insurance/Real Estate	0	6	2,457
General Services	2	8	5,181
Health/Legal Services	0	3	6,130
Education Services	0	69	6,603
Other Services	0	0	2,076
Government	<u>11</u>	<u>30</u>	<u>3,203</u>
TOTALS	99	278	76,345

Source: Department of Industry, Labor and Human Relations and Bay-Lake Regional Planning Commission.

INCOME

Brown County ranks second in the Bay-Lake Region for average per capita income, and is higher than the state average. According to the Wisconsin Department of Revenue's 1978 data, the average county resident has an average income of \$6,032/year. However, the high income average for an individual unit of government in Brown County is \$6,719 and the low is \$4,400.

The Village of Wrightstown may be the most impacted by the placement of the power plant in Brown County because of the nearness to the site. Wrightstown has an average per capita income below the county average. More employment positions with higher wages would be beneficial to the entire village in terms of tax revenues generated from them. Wisconsin Public Service Corporation will have a wage scale that will compare with similar facilities throughout the state, and some employees of WPSC can be expected to reside in Wrightstown because of its proximity to the power plant site.

The Town of Lawrence has a high income average and will be the primary residence for some of the employees at the power plant. Lawrence will gain by both tax revenues from residents and utility taxes paid directly to the town. Table 4 shows average gross income per capita for governmental units.

TABLE 4
AVERAGE GROSS INCOME PER CAPITA
1978 DATA

Town of Lawrence	\$6686
Village of Wrightstown	\$5092
Brown County	\$6032
State of Wisconsin	\$5936

Source: Wisconsin Department of Revenue - 1978 Data

COMMUNITY SERVICES

The Village of Wrightstown is the closest community to the proposed site in Brown County. Although many cities are within a relatively short distance of the plant site, Wrightstown could be the community most impacted by the power plant project. Community services such as sewer and water, schools, road maintenance and emergency services could become directly impacted with a sizeable population immigration. Any community in the vicinity of a new facility such as the one WPSC has proposed should inventory its existing community services to find potential problems. Small communities are more vulnerable than larger cities. A look at a few of the services provided by Wrightstown will assist in identifying where these problems could arise.

Sewer

The sewage treatment plant was initially put into operation in 1951. Modifications were made in 1959 to upgrade the facility, and this was the last major revision before a new facility was built. The old plant was designed and constructed to handle a maximum of 130,000 gpm of wastewater. It has primary and secondary treatment capabilities, and is a separated system, meaning the storm and sanitary sewers do not utilize

the same pipes. The final effluent is chlorinated and discharged into the Fox River.

The wastewater system consists of a main interceptor on each side of the river. Wastewater from the west side is brought to the east side through a twin 6" iron siphon that flows under the Fox River. The two sides merge before a 10" pipe takes the waste products to the treatment facility.

A new sewage treatment facility was completed in November 1980. Many of the existing components such as the transfer piping are being utilized by the new system. The village now has a capacity of 300,000 gpd. This plant was designed to service Wrightstown for 20 years.

Water

The Village of Wrightstown has had a municipal water supply since 1949. Two wells are utilized for meeting community demands, one on each side of the river. Both wells are at depths of 570 or more which places them into the Cambrian sandstone. A 12" water main lying beneath the Fox River connects the two sides. A 75,000 gallon elevated water reservoir is located on the west side near the newer well.

The combined capacity of the wells is approximately 550 gpm. The average consumption per capita is estimated to be 66 gpd. No significant industrial water use occurs.

An engineering study completed in July 1980 made the following recommendations. The first suggestion was to construct another storage facility to: (1) serve as an eventual replacement for the existing tank which is nearing

the end of its usefulness; (2) provide the east side with its water needs in case a problem should arise with the water main under the river; (3) provide a water supply which coincides with the fire flow demand. This would require an additional 200,000 gallon storage facility. However, since the village residents are now financing the new sewage treatment facility, action on the municipal water facility is still pending.

Schools

The Wrightstown School District has two schools, an elementary and a secondary school, both located in the Village of Wrightstown. Enrollment in the district has been steadily declining over the past few school years. This is a reversal from previous years when student enrollment had a steady growth pattern. Records from the Wisconsin Department of Public Instruction show a 16% smaller enrollment in the 1980-81 school year compared to the 1976-77 school year.

Wrightstown has had fluctuations in their teaching staff that closely coincide with student enrollment. Staff reductions have occurred with the declining enrollment, but not at the same pace as the enrollment drop. This situation has narrowed the student/teacher ratio from 20/1 ten years ago to 16/1 for the 1980-81 school year.

By looking at the enrollments in the lower grades in comparison to the upper high school grades, one can see that enrollment is still declining. Birth rates are continuing to decline, meaning the enrollment trend will continue to decline unless new families move into the village.

Recreation

The Village of Wrightstown has three outdoor recreation areas. The high school playfield is the only one that is owned and operated by the village. This facility is located on the southeast edge of town and is not readily accessible to the entire town. Recreation equipment and facilities have been improved in recent years and include tennis courts and baseball fields.

The local American Legion Post contributes space and facilities for communitywide recreation programs. Brown County operates the Wrightstown County Park and Boatlanding. These three areas are the only recreation facilities available to the village residents.

The Brown County Open Space and Outdoor Recreation Plan made two recommendations to the village to enable it to improve the recreation facilities.

1. The high school and elementary schools should have their playfields upgraded to provide standard playfields. (The high school has taken many steps toward improvement.)
2. It is recommended that a 7 to 10 acre parcel of land overlooking the Fox River be acquired on the west side.

LAND USE

Eight individual property owners are subject to losing acreage to the utility for the construction of the power plant facility. The entire site is zoned and used for agriculture. The only exception to tilled acreage is an 18 acre woodlot and the areas around the seven dwellings located on the site.

An estimated breakdown of land use by acreage is as follows:

Residential	9 acres
Wooded	18 acres
Agricultural	743 acres
TOTAL	770 acres

See Map 3 for land use on the Wrightstown site.

The Green Bay-Brown County Planning Commission has completed a soil analysis for the Town of Lawrence. Approximately 85% of the 770 acres within the site's boundaries have been rated as prime agriculture soils. The remaining 15%, located along the extreme western border, is rated as soils with low predicted crop yields.

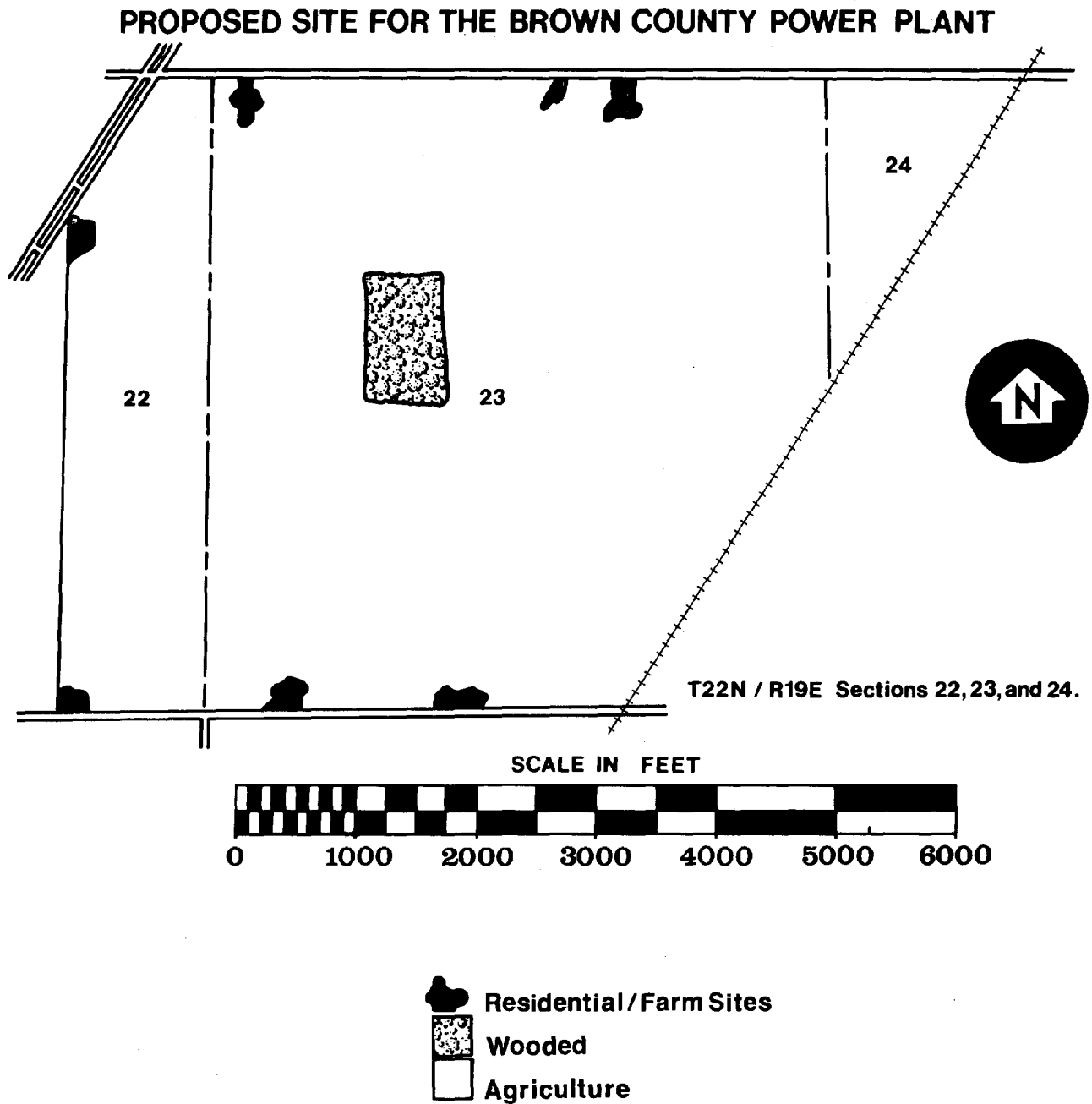
TRANSPORTATION NETWORK

Roads

The power plant site is accessible from surrounding urban areas by U.S. Highway 41, which is classified a principle arterial. U.S. Highway 41 is a multi-lane divided highway which runs north-south linking the Appleton-Green Bay areas and points beyond. This highway is adjacent to the western boundary of the proposed site. County Trunk Highway D is classified as a major collector road, which serves as a link between De Pere and Wrightstown. This road is located a few hundred yards to the east of the site and runs adjacent to the Fox River.

The boundaries on the north and south are local roads. These roads can accommodate low traffic volumes and can provide access to the plant from the west. The south road can be utilized as a link between the site access

MAP 3
LAND USE



Source: BLRPC.

road and the major road systems to the east and west. Map 4 shows the road system in relationship to the location of the site.

Railroads

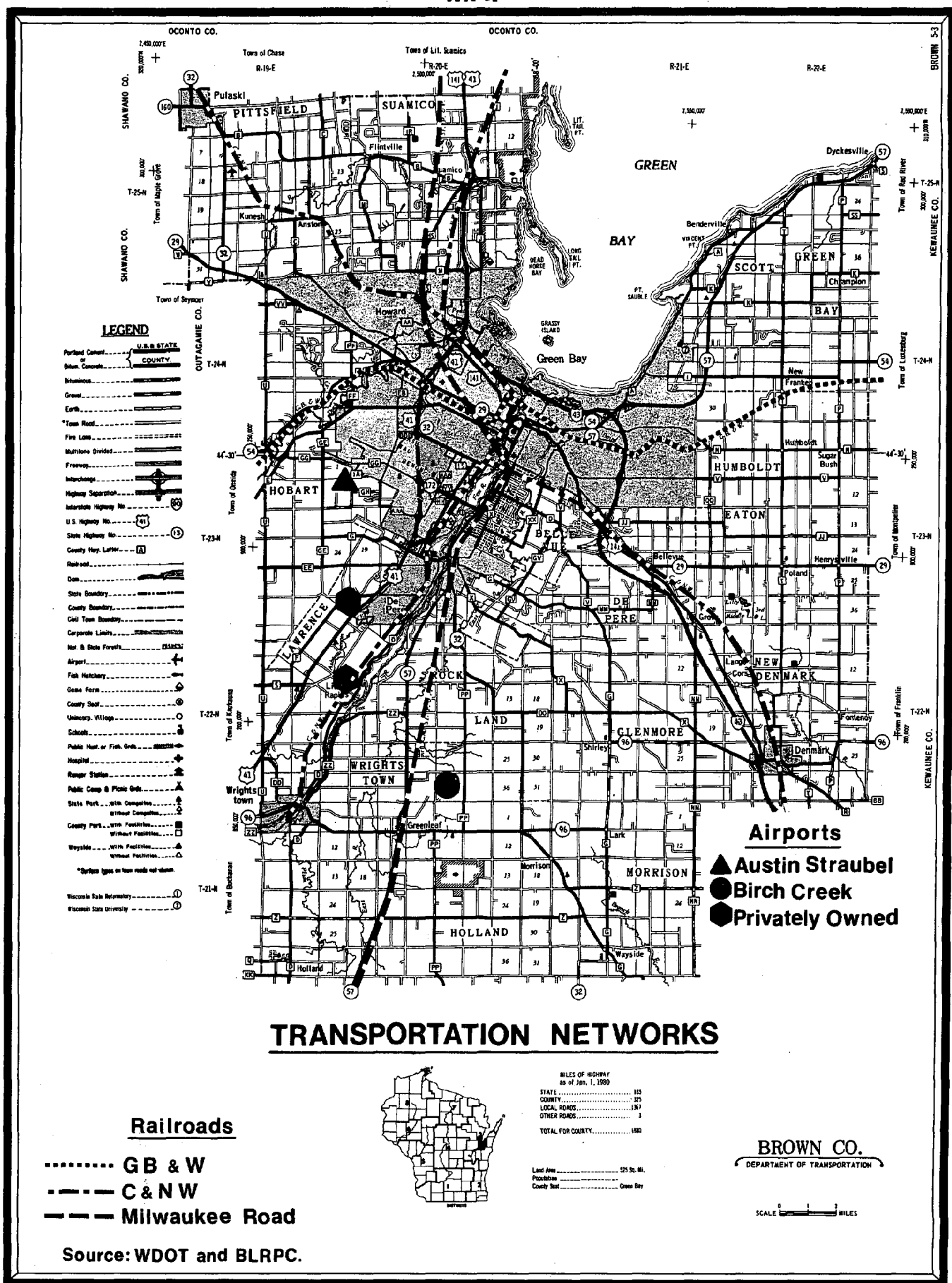
It is speculated that any coal movement to this area of Wisconsin will be by rail. A Chicago and Northwestern rail line, which serves as the eastern border of the site, will be the line serving the power plant from points north and south. This rail line has been designated as a B mainline, meaning the traffic density is at least 5 but less than 10 million annual gross tons. Wisconsin Public Service Corporation is anticipating approximately two unit trains per week. This will be a minor addition to the rail network, and no upgrading should be necessary. An unloading loop within the site with access to the C&NW line will be the major rail expense during the construction period. See Map 4 for the location of the C&NW line.

Airports

Four airports are located within a ten mile radius of the power plant site. Two allow private use only and are located in the Town of Lawrence only a few miles from the site. The other two are Austin Straubel Field, 8.5 miles northwest, and Birch Creek five miles east of the site.

Austin Straubel Field is a public airport. It serves as the air terminal hub for all air traffic and links the area to other regions of the nation. Because of the distance between the proposed power plant and the airport, there should be no interference between the operation of either facility.

MAP 4



The Birch Creek airport is located in the Town of Rockland about 5 miles east of the plant. The facility is privately owned but is open to the public. The two 550 foot smoke stacks of the power plant should not interfere with the glide path of planes approaching this airport.

The other two airstrips are privately owned and privately used. They are located within only a few miles of the plant site, and may be subject to smoke stack interference in their glide path. The location of these four airports are shown on Map 4.

Transmission Lines

Accompanying every electrical generating plant is a network of transmission lines distributing the power to its service area. The transmission lines in Northeastern Wisconsin range from 69 kilovolts (kV) to 345 kV. Each network requires a right-of-way which will vary with the power of the line. A 345 kV line, for instance, would need a 150 foot wide right-of-way. The normal procedure for acquiring land for transmission line right-of-ways is for the utility to purchase an easement. Property for a right-of-way is subject to condemnation.

The Lawrence site is located about one and a half miles south of the Lost Dauphin substation. Three transmission lines are serviced at the Lost Dauphin station. A 345 kV line originates at the Kewaunee nuclear power plant and continues toward central Wisconsin, a 138 kV line originates at the Pulliam Plant and supplies electricity to the Appleton area, and a 69 kV that runs north south. This site has good access to existing transmission lines in the area, however, a connector line will be required

between the proposed power plant and the Lost Dauphin substation. This will mean more property must be acquired to construct this line. A right-of-way of at least 150 feet wide would probably be required. Map 5 shows the location and routes of the transmission lines.

CONSTRUCTION PHASE IMPACTS

During peak periods of the construction phase, an estimated 450 to 550 persons will be employed. Workmen would be expected to converge on the plant site from the Fox River Valley area and the Green Bay urban area. The construction phase is expected to continue for a four year period.

Social and physical impacts may be more intense at this site than others because of its proximity to large populated areas and the visibility of the facility construction to a large number of motorists driving by the site.

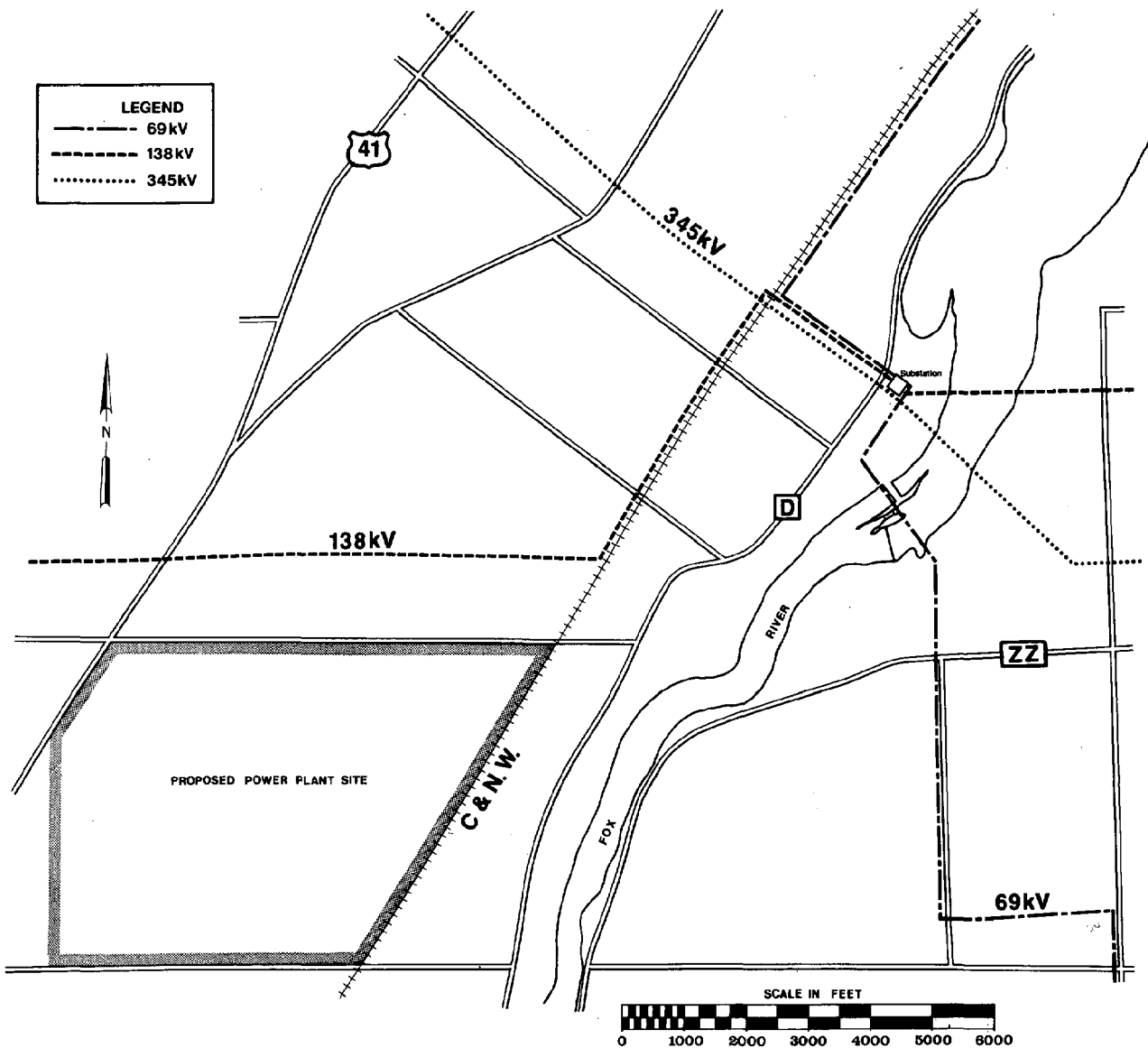
Utility shared taxes are paid to the town and the county in which the construction site is located. This tax money assists the governmental units cover any additional costs related to the utility development.

SOCIAL ENVIRONMENT

Relocation of Residents

Residents owning property on the proposed site will be compensated by the utility. If this site is chosen, the details of the compensation will be determined through a negotiation process. If this procedure fails, the case is sent to a condemnation court where a jury decides the value of the property.

MAP 5 TRANSMISSION LINES



Source:BLRPC.

Eight individually owned parcels comprise the 770 acre site and seven single family dwellings are located on site. If this site is chosen, the residents will probably have to relocate. In the case of the Weston Generating Facility in Marathon County, several residents remained on site; however, a WPSC spokesman anticipated all 770 acres in Lawrence would be put to use, leaving little probability of residents remaining.

Work Force

An estimated work force of 450 to 550 will be required during peak construction periods. The employment will be made up of primarily construction tradesmen, e.g. boilermakers, electricians and pipe fitters. The types of trades required for this phase are shown in Table 5. Because the Lawrence site is located within easy travel range of the metropolitan Green Bay area and the Fox River Valley cities, the bulk of the trades people can be expected to come from these areas. Any workers that cannot be contracted for locally must be brought in from other areas of the state. These crews are highly mobile and can easily move to different locations and settle for a short period of time. The construction labor force for the Village of Wrightstown and the Town of Lawrence combined would not make up a significant part of the skilled work force, however, miscellaneous jobs may be available to many who need the employment.

Both Lawrence and Wrightstown will be affected to a certain degree by the construction phase. Public services and retail businesses will have greater demands put on them due to their availability to the site.

TABLE 5
PROJECTED MANPOWER
BREAKDOWN OF PEAK WORK FORCE BY TRADE

Laborers	41
Carpenters	18
Op. Engineer	21
Iron Workers	25
Boilermakers	78
Electricians	77
Pipe Fitters	64
Millwrights	20
Insulators	28
Miscellaneous	<u>78*</u>
	450

* Miscellaneous includes Masons, Roofers, Sheet Metal Workers, Etc.

Source: Environmental Impact Statement -
Weston 3 Power Facility

LABOR RELATED IMPACTS

Housing

The communities around the Lawrence site will probably not be significantly impacted by an influx of new residents, because of the site location in regards to larger urban areas. However, housing must be available to certain employment groups. For instance, special trade groups called in from other areas of the state will require housing for several months at a time. Individual employees may choose to stay in the area during the work week and return to their homes for weekends. Other similar power plant facility projects have recorded employees living in mobile home parks near the site, occupying motels, living in vacant apartments and various other dwellings. Surrounding areas should be prepared to house employees for short periods of time.

Local Services

Neither Lawrence or Wrightstown are expecting significant immigration of people during this phase. If this holds true, existing services should be suitable as they are. Some impacts on services will exist because of the nearness of the site to Wrightstown. Road maintenance, health care, and law enforcement services are a few that may be affected even without an influx of people.

TRAFFIC

Traffic movement in the vicinity of the work area will primarily be the commuter traffic of the work force. With peak employment of 500 people, substantial increase of traffic will be noticed on some of the local roads. U.S. Highway 41, which runs adjacent to the site, has such a high volume of traffic already, that the additional commuter traffic should not affect road conditions or traffic movement on the highway. County Trunk D and the two local roads along the north and south boundaries have low volume use and may be impacted. The local road on the south side will serve as the entrance road to the site and would be expected to service all traffic coming to the site other than rail.

Based on a survey of other power plants, Sargent and Lundy Engineering stated in the Weston 3 E.I.S. that if the project has a work force of 500, approximately 1000 cars per day will travel these roads. The firm also estimated that during peak construction 50 equipment and material deliveries will be made per day by truck.

Surveys of other power plants showed that as many as two rail shipments per day were made to deliver equipment and materials. The C&NW line

that serves this site should not hinder major north-south highway traffic by the movement of these deliveries.

ECONOMIC ENVIRONMENT

Employment

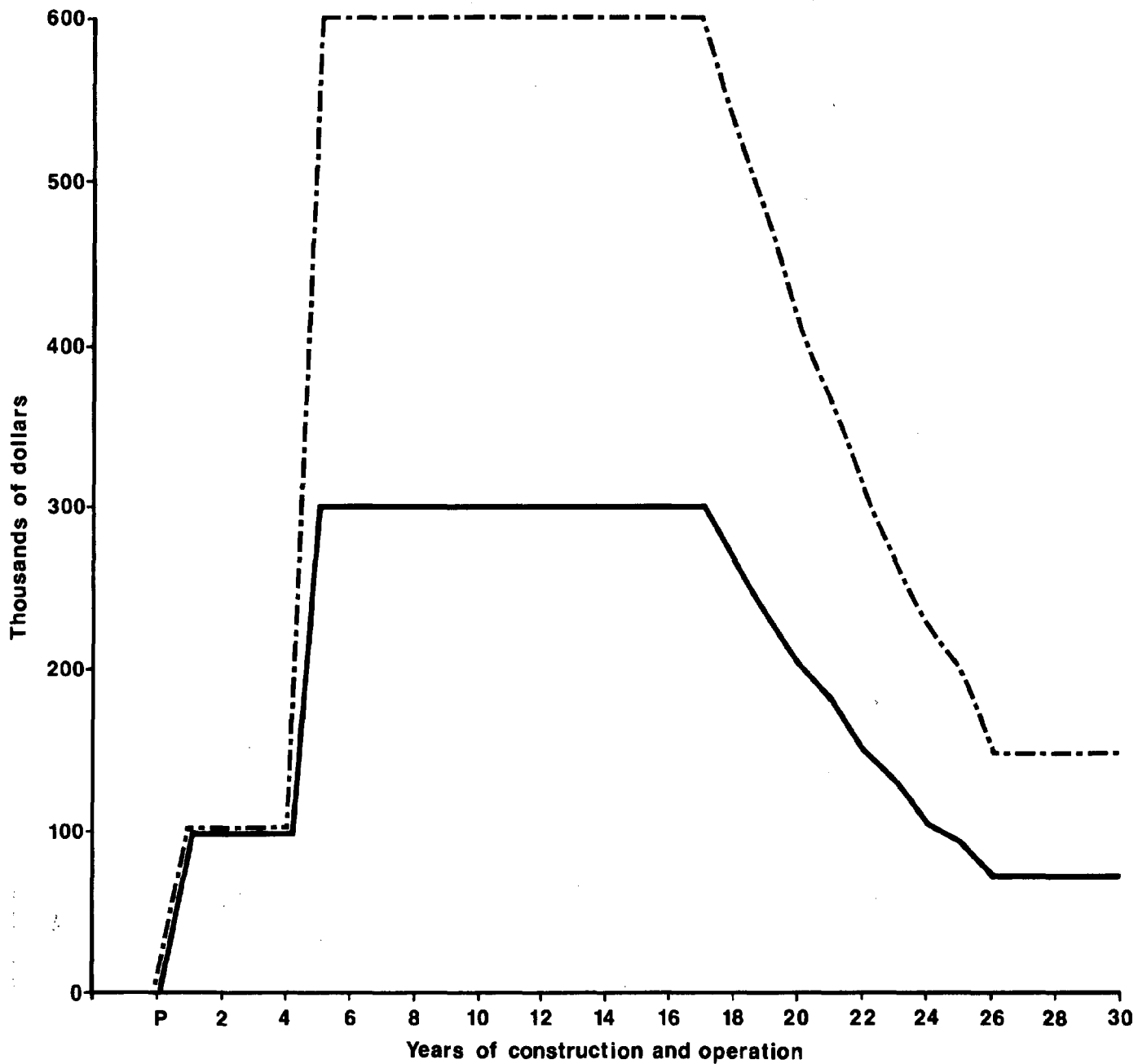
Additional employment created by the plant other than the construction work force is dependent on additional demands put on various sectors by the construction work force. If relocating is minor as expected, no major change in the community employment status would be expected. If additional jobs become available due to plant employees, it will probably be in the retail businesses such as bars, restaurants, and service stations along the commuting corridors.

Utility Shared Tax

The way that the Utility Shared Tax Law is now structured, the Town of Lawrence and Brown County will both receive \$100,000 from the utility shared tax revenue during the first four years after the construction phase is begun. This tax is distributed to the local governments by the state to help local governments with added costs such as road maintenance and various public services created by the construction impacts of the power plant facility.

The system is set up to provide money for the county and town in which the facility is placed, however, the most impacted governmental unit could be the Village of Wrightstown, who will receive no money. See Table 6 for the utility tax distribution. Based on past legislative actions it is reasonable to predict that the structure of this tax will change before the 1988 construction date.

Table 6
UTILITY SHARED TAX PAYMENT



— Amount paid to Town

-.- Amount paid to County

P Pre-engineering costs prior to construction; no money returned to Town or to County

(These payments are due to ad valorem taxes on one 400 megawatt power plant) Sandberg, 1979

SOURCE: Peter Zieman. Selected Social and Economical Impacts of Power Plants.

PHYSICAL ENVIRONMENT

Surface Water

Construction phase impacts on the Fox River should be relatively minor due to the distance between the site and the river and the large size of the river. Most of the suspended solids entering the river will come from airborne particles and erosion from constructing the intake structure and discharge outfall pipes below the water surface. This activity is, however, regulated through a Wisconsin Pollutant Discharge Elimination System (WPDES) permit and no major impacts are expected.

Noise

Sound levels are expected to be high during construction periods, especially during moments when many pieces of equipment operate simultaneously and at full load. The Housing and Urban Development (HUD) recommended levels for external noise exposure could be exceeded, this however, is difficult to predict. If the construction pattern of this facility is similar to the Weston power plant near Wausau, construction activities would be confined to daylight hours, five days a week. However, if the project begins falling behind schedule, night work would probably occur.

Distance from the noise source dilutes the sound, and the rural setting minimizes the impacts on any large concentration of people. However, since the site lies adjacent to U.S. Highway 41, many people will come into contact with the noise of the construction for a short period of time. Trees and earth berms would also help break up the sound. The site design may incorporate some methods to lessen noise impacts.

OPERATIONAL PHASE IMPACTS

The operation of the proposed power plant is expected to begin in 1992, and will have an expected life span of at least thirty years. This facility will employ approximately seventy people, all permanent positions. In addition to the revenues from the seventy new jobs, the utility pays a tax which is funneled back to the local town and county to help with any added costs that the facility may impose on the local units of government.

Impacts caused by the presence of a power plant will affect an area in both positive and negative ways. The economic gains from increased employment and the shared tax can be a substantial boost to an area. The negative impacts range from aesthetic deterioration to environmental alterations. Due to the tall smoke stacks sending the air pollutants airborne, other regions of the country will be impacted by the pollutants as well as our own.

SOCIAL ENVIRONMENT

Transportation

Coal movement within the region is uncertain at this time because of the number of possible routes for transporting coal. The movement to the site will be on the C&NW line running along the eastern boundary. There are several points where coal can be brought into the state before shifting to the C&NW. Shipments may come across the northern tier of the state on the Soo Line before linking with the C&NW in Powers, Michigan.

Shipments could also come via the Green Bay & Western (GB&W) from the Burlington Northern (BN) and be brought directly into Green Bay. At this point the rail change can be made to the south bound C&NW for the trip to the site.

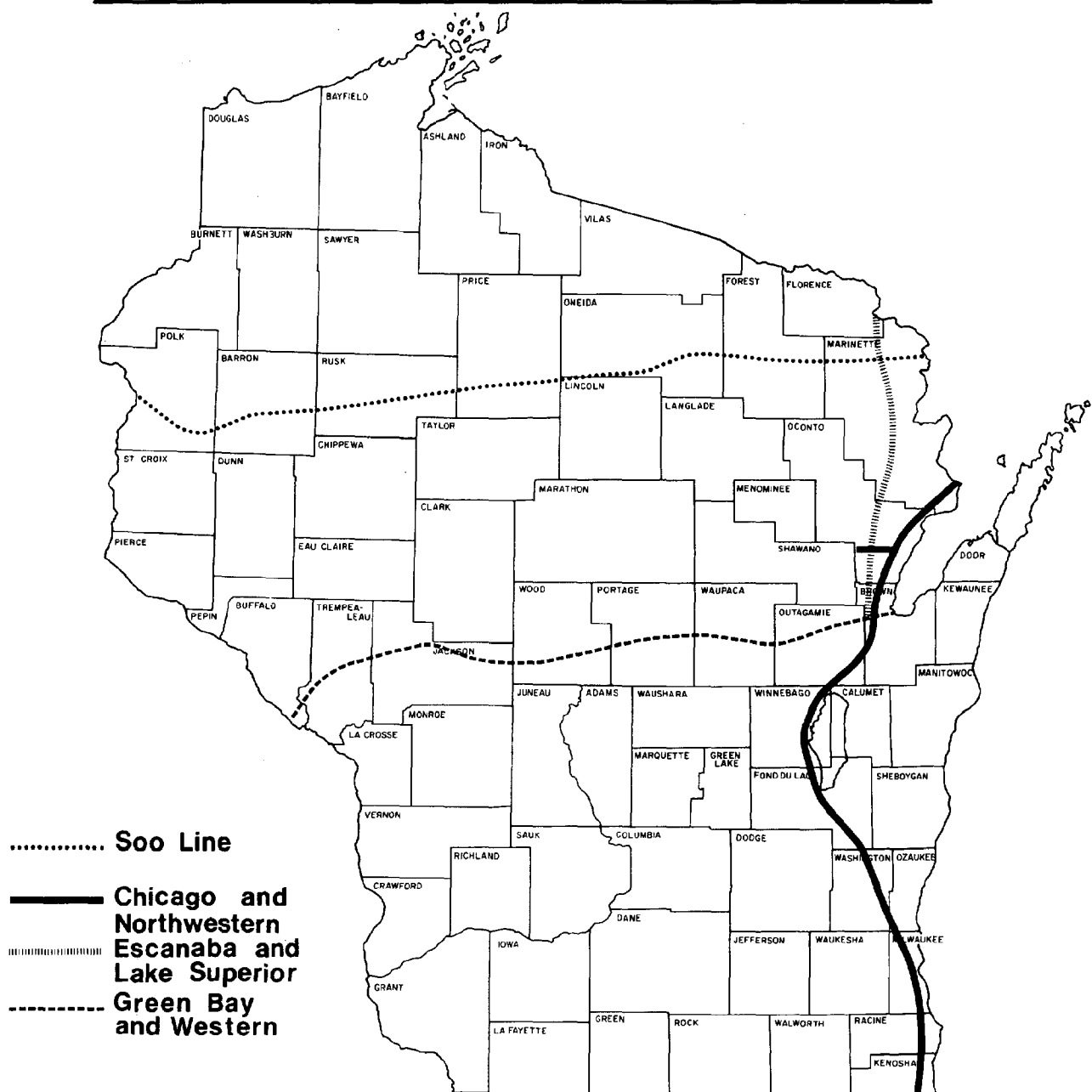
Any shipments coming from the Chicago or Milwaukee areas would be shipped by the Chicago & Northwestern line directly to the site. The expected frequency of coal train movement to the power plant would be about two unit trains per week. Cities such as Wrightstown, Appleton, Oshkosh and Fond du Lac would be directly impacted by the movement of unit trains through these cities. These mile long unit trains will affect traffic movement in the cities, but should not affect highway movement. Map 6 shows possible coal routes to the site.

Employment

The power plant in the operational phase will employ approximately seventy people. Most of these positions are highly technical or administrative and will first be offered to WPSC personnel located in other areas. It is difficult to predict where the labor force for the operational phase will come from or will settle. Because of the site's close proximity to larger urban areas, it is conceivable that the labor force could be spread throughout commuting range of the plant.

The influx of new residents into an area creates a multiplier effect for employment in other sectors. If the seventy utility employees settled in the Village of Wrightstown, one source estimates 48 additional jobs opening up in various job sectors. Table 7 lists the type of additional

MAP 6 POTENTIAL COAL ROUTES FROM THE WEST



Source: WDOT.

employment that can be expected from the addition of seventy people to an area.

TABLE 7
EMPLOYMENT CHANGES TO SERVE
70 NEW INDUSTRIAL WORKERS AND THEIR FAMILIES

	Number of People
Wholesale and Retail Trade	15
Construction	2
Professional Related Services	12
Transportation, Communication, and Other	
Public Utilities	8
Business and Personal Services	4
Finance, Insurance, and Real Estate	4
Industry not Reported	3
TOTAL	48

Source: Economic Analysis and Study, What New Jobs Mean to a Community; Washington, D.C., Chamber of Commerce of the U.S., 1973, and Environmental Impact Statement - Weston 3 Power Facility.

ECONOMIC ENVIRONMENT

Utility Tax

Wisconsin Public Service Corporation pays special utility taxes to the state which in return would redistribute the money back to the Town of Lawrence and the County. The purpose of this tax is to help communities to offset additional costs that the facility imposes. As the utility tax structure now stands, the payments will begin at \$300,000 per year to the Town of Lawrence and \$600,000 per year to the County. As the plant depreciates, the tax payments will decline. Payments to the town and county should not decline below \$300,000 and \$600,000 respectively until the plant is about twenty years old. Payments may decrease over time to a minimum level of \$75,000 yearly to the town and \$150,000 to the county, due to the depreciation of the plant. See Table 6 for utility tax

distribution. Again, this description is based on the present utility shared tax law. It is reasonable to expect changes in the law between now and the 1992 plant start-up date.

Community Services

A large influx of people into a single community is not expected because of the central location of the site. If this holds true, no major revisions in community services will be necessary.

PHYSICAL ENVIRONMENT

Land Uses

Land use on the site other than the main plant facilities differ at each plant. Many utilities absorb all available land on the site and no other use occurs. But some utilities plan for parcels to be used in a recreational, agricultural or open space modes. Residents are sometimes allowed to continue living in their homes if they are not obstructing operations. This is not expected to be the case in Lawrence. The layout of the facility will utilize all available land.

Power plants located in developed areas often attract other industrial growth to the immediate area. Frequently, agricultural or open space is replaced by this industrial development.

Water Quality

At a power plant site both surface and ground water sources are potentially threatened by plant operations. Ground water could potentially be affected by leaching of the solid waste disposal area. Although a clay liner is installed to prevent the seeping of these products, some seepage will occur.

The site is designed to keep infiltration at a minimum, and natural processes of the soil should remove impurities in leachate before it would do harm to surrounding domestic wells.

One concern to surface water is the thermal effects. Discharge from the cooling process is a warmer water than the temperatures of the Fox River. The Wisconsin Administrative Code, Section NR 102.02 contains the standards for thermal discharge.

"The maximum temperature rise at the edge of the mixing zone above the existing natural temperature shall not exceed 5° F for streams."

Other potential impacts that a power plant may have upon the surface water is water quality due to chemical discharges, surface seeps or runoff from the solid waste disposal site, and stream flow volumes.

Air Quality

One of the major impacts associated with coal fired power plants is the emission of atmospheric pollutants. The three pollutants that are most associated with these power plants are particulate matter, sulfur oxides and nitrogen oxides. These three pollutants are the most heavily regulated and widely studied pollutants generated by coal fueled power plants. Some of the information used in the following air pollution impact analysis came from such sources as: Energy in Americas Future; Wisconsin Natural Resources, May-June 1980; Activities, Effects and Impacts of the Coal Cycle for a 1000-MW Electric Power Generating Plant; National Geographic, November 1981; and Energy Facility Impacts.

In 1975 the electric utility industry accounted for 20% of all particulate matter in the United States, according to the U.S. Nuclear Regulatory Commission in the report, Activities, Effects and Impacts of the Coal Cycle for a 1000-MW Electric Power Generating Plant. Nearly 99% of this matter can be collected through current technologies used in today's generating facilities. The one percent that is not collected, however, are the fine particulates. Recent studies show that these fine particulates commonly have such trace metals as arsenic, cadmium, manganese, mercury, nickel and vanadium. Many of these elements are toxic and may have long term effects. Some effects associated with particulate emissions are:

- Toxic materials carried into the respiratory tract.
- Reduction of direct sunlight.
- Reduced visibility.
- Interference with plant physiology.
- Adverse effects on animals that have ingested particulate covered plants.

Power plants account for 28% of all nitrogen oxides (NO_x) emitted in the United States. Most of the NO_x produced from the combustion of coal is nitric oxide (NO) and nitrogen dioxide (NO_2). Nitric oxide is not generally a threat to human health or the environment, however, it can be converted to NO_2 which can be a threat. Some effects of nitrogen dioxide upon the environment include:

- Levels above 100 ppm are lethal to most animals.
- Repeated exposure in sub-lethal doses has resulted in early pulmonary emphysema-type lesions in experimental animals.

- NO₂ may have a significant role in chronic lung disease, corrosion damage and reducing the yield of selected crops.
- NO₂ is a possible cause of acid rain.

Over 64% of the sulfur oxides (SO_x) emitted in this country comes from the electric utility industry. The main element of SO_x formed during the combustion of coal is sulfur dioxide (SO₂). Sulfur dioxide is the major environmental concern associated with burning coal to generate electricity. In general, SO₂ is not a major health or environmental problem. It is only after SO₂ is emitted into the atmosphere and various chemical reactions take place, that it is capable of environmental damage. When SO₂ is emitted into the atmosphere a part of it oxidizes, forming sulfuric acid. Some of the effects that SO₂ can have on human health and the natural environment include:

- Severe respiratory reactions
- Chronic obstructive lung disease
- Probable impacts on the yields and growth of selected crops
- Possible cause of acid rain

Acid rain may be one of the most significant environmental problems of the 1980's. This phenomenon occurs when the oxides of sulfur and nitrogen mix with atmospheric water vapor creating sulfuric and nitric acids. Much is yet to be learned about acid rain and its impacts upon human health and the natural environment. Aquatic environments are the most sensitive to increased levels of acid, but acid rain is also suspected to threaten: forests, crops, soils, wildlife, groundwater and possibly human health. The Clean Air Act has been the major tool used in controlling air pollution by new pollution sources by establishing emission standards. To comply

with these standards the plant will be constructed with modern technologies. Many of the impacts associated with older coal fire power plants have been eliminated.

SUMMARY

The utility shared tax money is redistributed back to the county and town in which the plant is located. In the case of the Lawrence site, the community most impacted will get no direct payment. The Village of Wrightstown is located two miles from the site, and may absorb many of the impacts created by both the construction and operational phase of the plant. Many of the Wrightstown local services such as law enforcement, health care, road maintenance and schools, will be used by the plant and its employees, and yet the village will get no direct compensation. New workers relocating to Wrightstown or local residents receiving jobs at the plant will, however, bring in additional revenues into the community. The wage structure for the plant will be similar to other projects around the state.

The utility tax as it is now structured will contribute a total of \$200,000 per year within the county during the first four years of construction, and approximately \$900,000 per year for possibly the next twenty years. The tax will continue as long as the power plant exists but will lessen with the depreciation of the plant. Some of the county's share of this revenue could be directed back to the Village of Wrightstown to help in the maintenance and improvement of their community services. The Town of Lawrence is guaranteed a direct payment for the same purpose.

The physical aspects of this site may make it a prime choice among the sites. The location makes the site accessible to the large urban areas to the north and south. This is important for the availability of labor for the construction phase, the housing of incoming employees and the accessibility of services that may be required.

The Chicago & Northwestern line that serves as the east boundary line is in good condition and can handle the two unit trains per week that could be expected. The movement of these trains will impact auto movement in several cities along the route, however, auto movement on U.S. Highway 41 should not be affected by unit train deliveries anywhere between Green Bay and Milwaukee.

The Brown County site has good access to existing networks of transmission lines. The Lost Dauphin substation is only one and a half miles north of the site. This station services a 345 kV, a 138 kV and a 69 kV at the present time.

The physical features of the area, such as terrain, geology and available water sources, make this site more attractive than the other sites. For instance, the clay formations located on the site may be suitable for the liner needed in the solid waste landfill, and there is an adequate source of both surface and groundwater.

Because of the visibility of this site to large numbers of people, the aesthetic impacts of the plant in this scenic area may be compounded. But due to the many positive physical features of this site, it may be the most attractive choice for the utility.

BAY-LAKE REGIONAL PLANNING COMMISSION

COMMISSION

BROWN COUNTY
Eunice Garsow
Samuel J. Halloin
Mary M. Webb
Secretary-Treasurer

DOOR COUNTY
Gordon H. Nelson
Norman Stegmann
Ida Mae Weber

FLORENCE COUNTY
Alfred Lund
Louis M. Nelson
Horace A. Nixon

KEWAUNEE COUNTY
Rufus J. Entringer
Paul Wolske
Clarence Ihlenfeldt

MANITOWOC COUNTY
Anthony V. Dufek
James M. Hendricks
Hilary Rath

MARINETTE COUNTY
Raymond C. Engel
Edward Gaber
Lawrence Theisen

OCONTO COUNTY
Ralph Heller
William F. Jarvey
James Hertwig

SHEBOYGAN COUNTY
Ronald A. Born
Vice-Chairman
James A. Paulmann
Richard W. Suscha
Chairman

STAFF

Ralph M. Bergman
Executive Director

Robert L. Fisher
Principal Planner

Carol D. Cutshall
Coastal Planner

Martin W. Holden
Local Assistance Planner

Mark J. Kolb
Cartographer/Planner

Thomas J. Klimek
Transportation Planner

Janet C. Perry
Economic Planner

John P. Pletcher
Associate Planner

Douglas O. Taubert
Graphics Coordinator

D. Joe Warnacut
Energy Planner

Jane M. Bouchonville
Office Coordinator

Debbie K. Bostwick
Clerk Typist II

Sandra A. Phillips
Typist I

REPORT PRODUCTION STAFF

Principal Author:
D. Joe Warnacut

Contributing Staff:
Carol D. Cutshall
Robert L. Fisher

Graphics:
Douglas O. Taubert
Mark J. Kolb
Susan A. Olson

Typist:
Debbie K. Bostwick

NOAA COASTAL SERVICES CENTER LIBRARY



3 6668 14104 9595